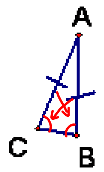
4.6 Isosceles Triangle Theorem

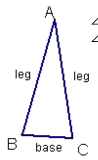
$\triangle ABC$ is isosceles

$\overline{AB} \cong \overline{AC}$

Isosceles $\triangle$ Theorem-(Theorem 4.9) If 2 sides of a $\triangle$ are $\cong$, then the angles opposite those sides are $\cong$. I$\triangle$thm ITT

Since $\overline{AB} \cong \overline{AC}$, then $\angle C \cong \angle B$



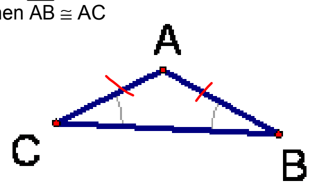


$\angle A$ is the vertex angle
$\angle B$ and $\angle C$ are the base angles

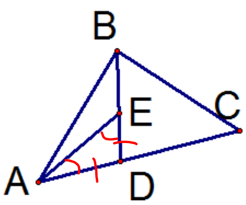
The Converse of the Isosceles $\triangle$Theorem-(Theorem 4.10) If 2 angles of a $\triangle$ are $\cong$, then the sides opposite those angles are $\cong$.

Conv. I$\triangle$thm

Since $\angle C \cong \angle B$, then $\overline{AB} \cong \overline{AC}$



Don't Write!



Name two congruent angles...

If $\overline{AB} \cong \overline{BC}$ $\angle C \cong \angle BAD$

If $\overline{BE} \cong \overline{AE}$ $\angle BAE \cong \angle ABE$

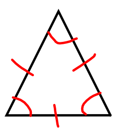
If $\overline{BD} \cong \overline{BC}$ $\angle C \cong \angle BDC$

Name two congruent segments....

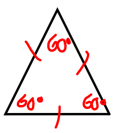
If $\angle AED \cong \angle DAE$ $\overline{AD} \cong \overline{ED}$

Corollary 4.3-A $\triangle$ is equilateral iff it is equiangular

"if and only if"



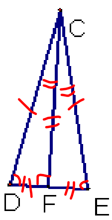
Corollary 4.4-Each angle of an equilateral $\triangle$ measures 60°.



*****The altitude of an isosceles △ is ⊥ to the base at its midpoint.

If $\overline{CF}$ is the altitude from the vertex angle, then DF = FE and m∠CFE = 90°

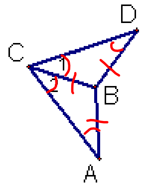
Why? ΔDFC ≅ ΔEFC by HL



ΔDFC ≅ ΔEFC

Proof Examples:

Given: AB = CB = BD
∠2 ≅ ∠1
Prove: ∠A ≅ ∠D

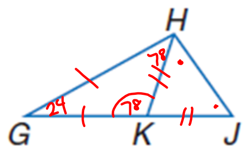


S.	R.
① ~~~~	① Given
② ∠1 ≅ ∠D ∠2 ≅ ∠A	② I △ thm
③ ∠A ≅ ∠D	③ Subst.

In the figure, $\overline{GK} \cong \overline{GH}$ and $\overline{HK} \cong \overline{KJ}$.

$m\angle G = 24$

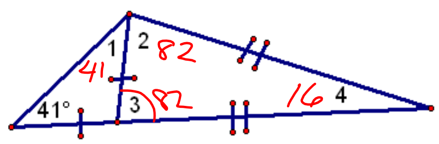
$m\angle J =$ 39°



78 ÷ 2

180
−24
156° ÷ 2

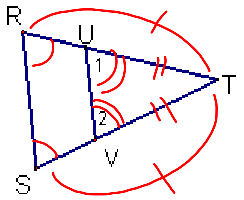
Find the measures of the numbered angles.



Given: $\angle R \cong \angle S$

$\angle 2 \cong \angle 1$

Prove: $\overline{RU} \cong \overline{SV}$



S.	R.
① ~	① Given
② $\overline{RT} \cong \overline{ST}$, $\overline{UT} \cong \overline{VT}$	② Conv. I∆ thm
③ $RT = ST$, $UT = VT$	③ def of $\cong$
④ $RT = RU + UT$, $ST = SV + VT$	④ SAP
⑤ $RU + UT = SV + VT$	⑤ Subst
⑥ $RU = SV$	⑥ Subtr.

HW

p219-220 #s 9-14, 19-26